

a wall, a bottom and a lid assembly defining a chamber volume;
a substrate support disposed within the chamber volume; and,
a chamber liner circumscribing the substrate support, the chamber liner having a passage fluidly isolated from the chamber volume at least partially formed in the chamber liner.

52. Apparatus for lining a chamber volume of a semiconductor processing chamber, comprising:

a liner having a plurality of apertures formed at least partially therein;
a passage at least partially formed in the liner and fluidly isolated from the chamber volume; and
a nozzle disposed in at least one of apertures.

REMARKS

This is intended as a full and complete response to the Office Action dated October 23, 2002, having a shortened statutory period for response set to expire on January 23, 2002. Claims 11-15, 21-28 and 37-52 are pending in the application. Claims 11-15, 21-28 and 37-52 stand rejected. In this response, claim 25 has been cancelled without prejudice and claim 37 has been amended. Please reconsider the claims pending in the application for reasons discussed below.

Claim 38 stands rejected under 35 U.S.C. 102(b) as being anticipated by *Shinichiro* (JP 63-005526 A) on grounds that *Shinichiro* shows the invention as claimed. Applicants respectfully traverse this rejection.

Shinichiro describes a dry etching device that has removable adhesion preventive plates with a heating unit. Any product produced by reaction of etching gas adhering to the adhesion preventive plates can be liberation-removed by heating. (See, Abstract and Figures.) *Shinichiro* does not teach, show or suggest a liner that comprises a passage adapted to flow a heat transfer medium. Therefore, *Shinichiro* does not teach, show or suggest a liner adapted to be removably disposed in the process volume and a passage at least partially formed in the liner isolated from the

process volume and adapted to flow a heat transfer medium therethrough. As a consequence, applicants respectfully submit that the claim is in condition for allowance and respectfully request withdrawal of the rejection.

Claims 11-15, 47-48 and 51 stand rejected under 35 U.S.C. 103(a) over *Pu et al.* (WO 99/48130) in view of *Goto et al.* (U.S. Patent 5,843,277) on grounds that it would have been obvious to modify the apparatus of *Pu et al.* so as to incorporate a water jacket within the chamber liner of *Pu et al.* because this will allow for greater temperature control and minimize deposition of by-products on the chamber walls. Applicants respectfully traverse this rejection.

Applicants would like to point out that *Pu et al.* (WO 99/48130) is a foreign equivalent to *Pu et al.* (US Patent 6,273,022 B1) cited in the previous office action (dated 10/11/2001). *Pu et al.* teaches a method and apparatus for inductively coupling electrical power in a processing system having a vacuum chamber. The vacuum chamber includes liners 26, 27. The liners 26, 27 include a passage for an exhaust port 24 and a passage (not shown) for process gas 22 to flow into the vacuum chamber. However, these ports and passages are in fluid communication with the chamber volume. Therefore, *Pu et al.* does not teach, show or suggest a chamber liner having a passage formed at least partially in the liner that is fluidly isolated from a chamber volume. *Goto et al.* discloses forming heat exchangeable water jackets in chamber walls between their outer and inner surfaces. Chamber walls are not analogous to liners. Liners are periodically replaced as part of a preventative maintenance routine (See, lines 4-5 of 5th paragraph, Background of the Invention), while chamber walls are part of a fixed chamber-hardware and are not periodically replaced as part of a preventative maintenance routine. Thus, *Goto et al.* does not teach, show, or suggest a chamber liner. The references, alone or in combination, do not teach, show, or suggest a chamber liner having a passage fluidly isolated from the chamber volume at least partially formed or disposed in the chamber liner. As a consequence, applicants respectfully submit that the claims are in condition for allowance and respectfully request withdrawal of the rejection.

With respect to claim 13, the examiner has failed to cite a reference of clamps being well known suitable fasteners in the art to support his position in rejecting the

claim. Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See, *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992); MPEP 2143.01. If the rationale to combine the prior art is based on common knowledge in the art, the examiner must cite a reference in support of his position or supply an affidavit attesting to the facts. (See, MPEP 2144.03.) Since no reference has been cited, applicants respectfully request withdrawal of the rejection, and respectfully request allowance of the claims.

Claims 21-22, 24 and 49-50 stand rejected under 35 U.S.C. 103(a) over *Pu et al.*, in view of *Goto et al.* as applied to claims 11-15, 47-48, and 51 above, and further in view of *Lei et al.* (JP 1100673A) on the grounds that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of *Pu et al.* modified by *Goto et al.* so as to include the liner and lid structure of *Lei et al.* because this will improve the thermal management of the gas injected into the apparatus. Applicants respectfully traverse this rejection.

Pu et al. does not teach or suggest a passage formed at least partially in the liner that is fluidly isolated from a chamber volume. *Goto et al.* does not teach, show, or suggest a chamber liner. Applicants would like to point out that *Lei et al.* (JP 11000673A) is a foreign equivalent to *Lei et al.* (US Patent 5,968,276) cited in the previous office action, dated October 11, 2001. Blocker plate 22 is not considered a liner for the assembly. Its purpose is to channel process gas to the gas distribution plate 24. (See, col. 1, lines 66-67.) The gas distribution plate 24 resides between the chamber volume and the blocker plate 22. (See, Figs. 2 and 10.) *Lei et al.* only discloses a lid structure with water-carrying channels 28 and coolant liquid pool 68 for the reactant gases to reduce unwanted reactions between components of the deposition gas. (See, col. 1, lines 18-23). *Lei et al.* does not teach, show or suggest a chamber liner. The references, alone or in combination, do not teach, show or suggest a chamber liner having a passage fluidly isolated from the chamber volume at least partially formed or disposed in the chamber liner. As a consequence, applicants

respectfully submit that the claims are in condition for allowance and respectfully request withdrawal of the rejection.

Claim 23 stands rejected under 35 U.S.C. 103(a) over *Pu et al.*, *Goto et al.*, and *Lei et al.* as applied to claims 21-22, 24, and 49-50, and further in view of *Zhao et al.* (EP 0,855,735 A2) on the grounds that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of *Pu et al.* modified by *Goto et al.* and *Lei et al.* to incorporate nozzles into the apertures because this allows for better control of the gas being input to the chamber. Applicants respectfully traverse this rejection.

Pu et al., *Goto et al.* and *Lei et al.*, alone or in combination, do not teach, show or suggest a chamber liner having a passage fluidly isolated from the chamber volume at least partially formed or disposed in the chamber liner. *Zhao et al.* describes a chamber lid liner 70 and a chamber wall liner 72. *Zhao et al.* does not describe showerhead 40 as a liner. A showerhead is not analogous to a liner. A liner is periodically replaced as part of a preventative maintenance routine (See, lines 4-5 of 5th paragraph, Background of the Invention), while a showerhead is a fixed chamber component and is not periodically replaced as part of a preventative maintenance routine. Thus, *Zhao et al.* does not teach, show, or suggest a chamber liner with nozzles. The references, alone or in combination, do not teach, show or suggest a chamber liner having a passage fluidly isolated from the chamber volume at least partially formed or disposed in the chamber liner and having a plurality of nozzles. As a consequence, applicants respectfully submit that the claim is in condition for allowance and respectfully request withdrawal of the rejection.

Claims 26, 28 and 52 stand rejected under 35 U.S.C. 103(a) over *Lei et al.*, in view of *Zhao et al.* on the grounds that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of *Lei et al.* to incorporate nozzles into the apertures because this allows for better control of the gas being input to the chamber. Applicants respectfully traverse this rejection.

Lei et al. and *Zhao et al.*, alone or in combination, do not teach, show or suggest a chamber liner with a nozzle. Neither do they teach a chamber liner with a channel having an inlet and an outlet disposed in the liner. As a consequence, applicants

respectfully submit that the claims are in condition for allowance and respectfully request withdrawal of the rejection.

Claim 27 stands rejected under 35 U.S.C. 103(a) over *Lei et al., Zhao et al.*, as applied to claims 26, 28 and 52 above, and further in view of *Takeuchi et al.* (US Patent 5,824,158) on the grounds that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of *Lei et al.* in view of *Zhao et al.* so as to include nozzles made of quartz because this will prevent the inclusion of impurities in the process gas. Applicants respectfully traverse this rejection.

Lei et al. and *Zhao et al.* do not teach, show or suggest a chamber liner with a nozzle. *Takeuchi et al.* describes a nozzle made of quartz, but *Takeuchi et al.* does not teach, show or suggest a nozzle in a chamber liner. The references, alone or in combination, therefore, do not teach, show or suggest a chamber liner with a nozzle. As a consequence, applicants respectfully submit that the claim is in condition for allowance and respectfully request withdrawal of the rejection.

Claim 37 stands rejected under 35 U.S.C. 103(a) over *Lei et al.*, in view of *Kugo et al.* (US Patent 6,007,673) on the grounds that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of *Lei et al.* so as to texture the liner as taught by *Kugo et al.* because this will allow for a process to be performed within the apparatus with little contamination. Applicants respectfully traverse this rejection.

Lei et al. does not teach, show, or suggest a chamber liner. *Kugo et al.* describes texturing a quartz-top plate 14 (See col. 11, lines 28-29). A top plate is not analogous to a liner. A liner is periodically replaced as part of a preventative maintenance routine (See, lines 4-5 of 5th paragraph, Background of the Invention), while a top plate is part of a fixed chamber-hardware and is not periodically replaced as part of a preventative maintenance routine. Thus, *Kugo et al.* does not teach, show or suggest a chamber liner. The references, alone or in combination, do not teach, show or suggest a chamber liner. As a consequence, applicants respectfully submit that the claim is in condition for allowance and respectfully request withdrawal of the rejection.

Claims 39-43 and 45-46 stand rejected under 35 U.S.C. 103(a) over *Shinichiro* on the grounds that a prima facie case of obviousness still exists because the choice of

the particular shape of the wall is a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed wall was significant. (See, *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).) Applicants respectfully traverse this rejection.

Shinichiro describes a dry etching device that has removable adhesion preventive plates (liners) with a heating unit. *Shinichiro* does not teach, show or suggest a liner that comprises a passage adapted to flow a heat transfer medium. Applicants respectfully submit that the claims are in condition for allowance and respectfully request withdrawal of the rejection.

Claim 44 stands rejected under 35 U.S.C. 103(a) over *Shinichiro* as applied to claims 39-43 and 45-46 above, and further in view of *Pu et al.* on the grounds that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of *Shinichiro* so as to also incorporate the liner onto the substrate support as taught by *Pu et al.* because this would provide for increased temperature control over the surfaces of the chamber as well as easier cleaning of the chamber. Applicants respectfully traverse this rejection.

Shinichiro describes a dry etching device that has removable adhesion preventive plates (liners) with a heating unit. *Shinichiro* does not teach, show or suggest a liner that comprises a passage adapted to flow a heat transfer medium. *Pu et al.* describes a vacuum chamber with liners 26 and 27 that include passages and ports in fluid communication with the chamber volume. *Pu et al.* does not teach, show or suggest a liner with a passage at least partially formed in the liner isolated from the process volume. The references, alone or in combination, do not teach, show, or suggest a chamber liner having a passage at least partially formed in the liner isolated from the process volume and adapted to flow a heat transfer medium therethrough. As a consequence, applicants respectfully request withdrawal of the rejection, and respectfully request allowance of the claim.

In conclusion, the references cited by the Examiner, neither alone nor in combination, teach, show, or suggest the apparatus or method of the present invention. Having address all issues set out in the office action, Applicants respectfully submit that

the claims are in condition for allowance, and respectfully request that the claims be allowed.

Respectfully submitted,


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APPENDIX

37. (Amended) The apparatus of claim [25] 26, wherein the second side of the liner is textured.